CLAIMS

What is claimed is:

1. A method for fabricating a compound optic for short wavelength radiation, the method comprising:

removing material of a substrate to form a surface profile of a first optical element of the compound optic; and

forming the second optical element of the compound optic.

2. A method as claimed in claim 1, wherein the step of removing the material comprises applying a tool tip of a turning machine to the substrate to mechanically remove the material.

3. A method as claimed in claim 1, wherein the step of removing the material comprises directing a beam at the substrate.

4. A method as claimed in claim 3, further comprising forming calibration features in the substrate.

5. A method as claimed in claim 4, further comprising forming the calibration features by electron beam lithography.

6. A method as claimed in claim 4, wherein the calibration features comprise linear scales in the plane of the first optical element.

7. A method as claimed in claim 4, wherein the calibration features comprise trenches extending into the substrate.

8. A method as claimed in claim 4, further comprising forming trench calibration features in the substrate prior to the step of directing the beam at the substrate.

9. A method as claimed in claim 8, wherein the trenches are formed by lithography.

10. A method as claimed in claim 8, wherein the trenches set the desired step profile for the first optical element.

11. A method as claimed in claim 3, wherein the step of directing a beam comprises directing a laser beam at the substrate to ablate the material.

12. A method as claimed in claim 3, wherein the step of directing a beam comprises directing an electron beam at the substrate to ablate the material.

13. A method as claimed in claim 3, wherein the step of directing a beam comprises directing an ion beam at the substrate to ablate the material.

14. A method as claimed in claim 3, wherein the step of directing a beam comprises directing a plasma beam at the substrate to ablate the material.

15. A method as claimed in claim 1, further comprising forming an optical port on a backside of the substrate.

16. A method as claimed in claim 15, wherein the step of forming the second optical element comprises forming the element in the optical port.

17. A method as claimed in claim 15, wherein the step of forming the second optical element comprises forming a zone plate lens.

18. A method as claimed in claim 1, wherein the step of removing the material comprises etching into the substrate through a patterned resist layer to transfer a pattern of the resist layer into the substrate.

19. A method as claimed in claim 1, wherein the step of removing the material comprises selectively reacting a surface of the substrate to remove the material.

20. A method as claimed in claim 19, wherein the step of selectively reacting the surface comprises directing a laser beam at the surface through a chlorine atmosphere.

21. A method for fabricating a compound optic for short wavelength radiation, the method comprising:

forming a surface profile of a first optical element of the compound optic on a substrate;

forming a fiducial mark on the substrate; and

forming the second optical element of the compound optic by reference to the fiducial mark

22. A method as claimed in claim 21, further comprising forming an optical port on a backside of the substrate

23. A method as claimed in claim 22, wherein the step of forming the second optical element comprising forming the second optical element in the optical port.

24. A method as claimed in claim 21, wherein the step of forming the second optical element comprises forming a zone plate lens.

25. An optical element for short wavelength radiation, the element comprising:

concentric rings for focusing a beam of short wavelength radation; and

segments extending at least partially radially between the concentric rings to support the rings.

26. An optical element as claimed in claim 25, further comprising a frame extending around at least a portion of a perimeter of the concentric rings, segments extending between the rings and the frame to support the rings in the frame.

27. An optical element as claimed in claim 25, wherein the optical element is a zone plate lens.

28. An optical element as claimed in claim 25, wherein the optical element is a Fresnel refractive lens.

29. An optical element as claimed in claim 25, wherein the concentric rings are fabricated from silicon.

30. An optical element as claimed in claim 25, wherein the concentric rings are fabricated from copper.